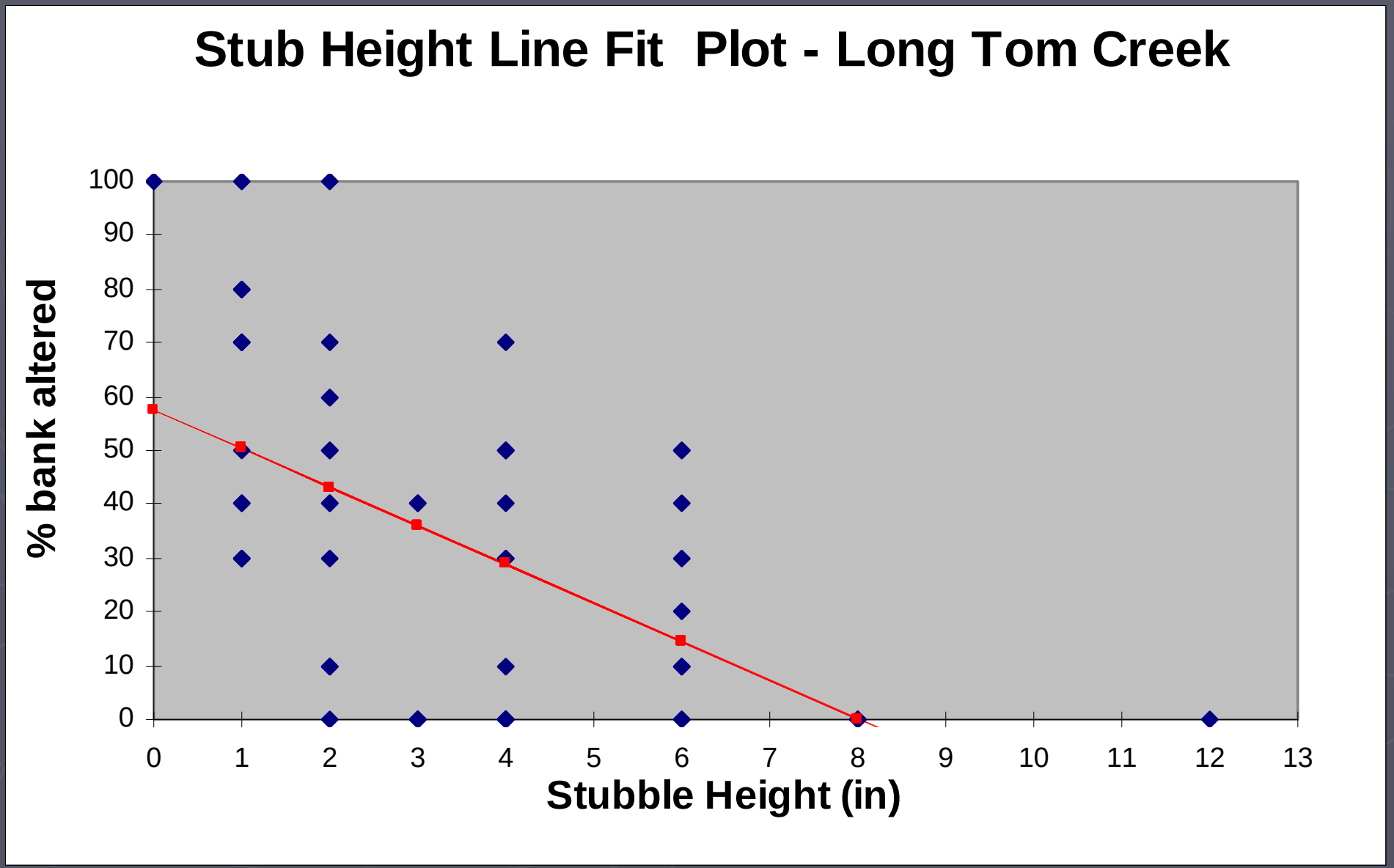
Collecting multiple indicators- allows local stubble height criteria refinement.



- **Where:** "Designated monitoring areas": areas along stream reaches that are used by livestock and other large herbivores.
- **Sample size:** The reach is 110 meters or about 361 feet of stream. 40 to 50 plots each side of stream
- **Method:** paced transect along the greenline (as defined by Winward 2000). The interval is determined by the number of plots needed to achieve desired confidence level.

Protocols are based on....

- Stubble Height – Interagency Tech Reference (1996)
- Woody browse – Interagency Tech Reference (1996)
- Bank Alteration – Cowley 2004
- Vegetation - Winward (2000) and Coles-Ritchie *et al* (2003)
- Bank Stability - Henderson *et al* (2003)

Tests – 5 teams

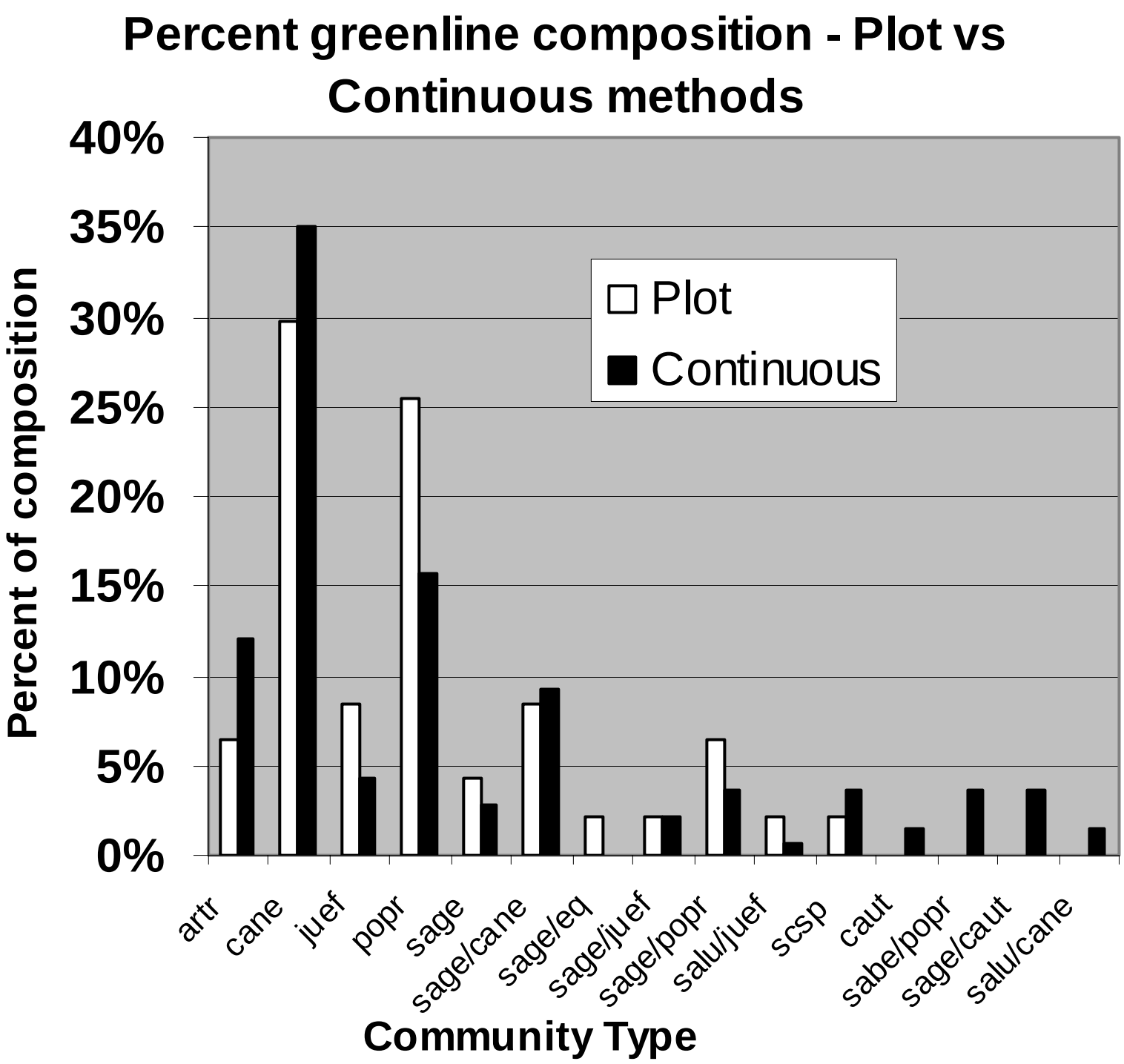
- Bank alteration –
  - Mean – 21%, Range 16% to 27%
- Woody browse –
  - Mean .14%, Range 0 to .7%
- Stubble Height –
  - Average = 6.1, Range 5.7 to 6.4

Tests

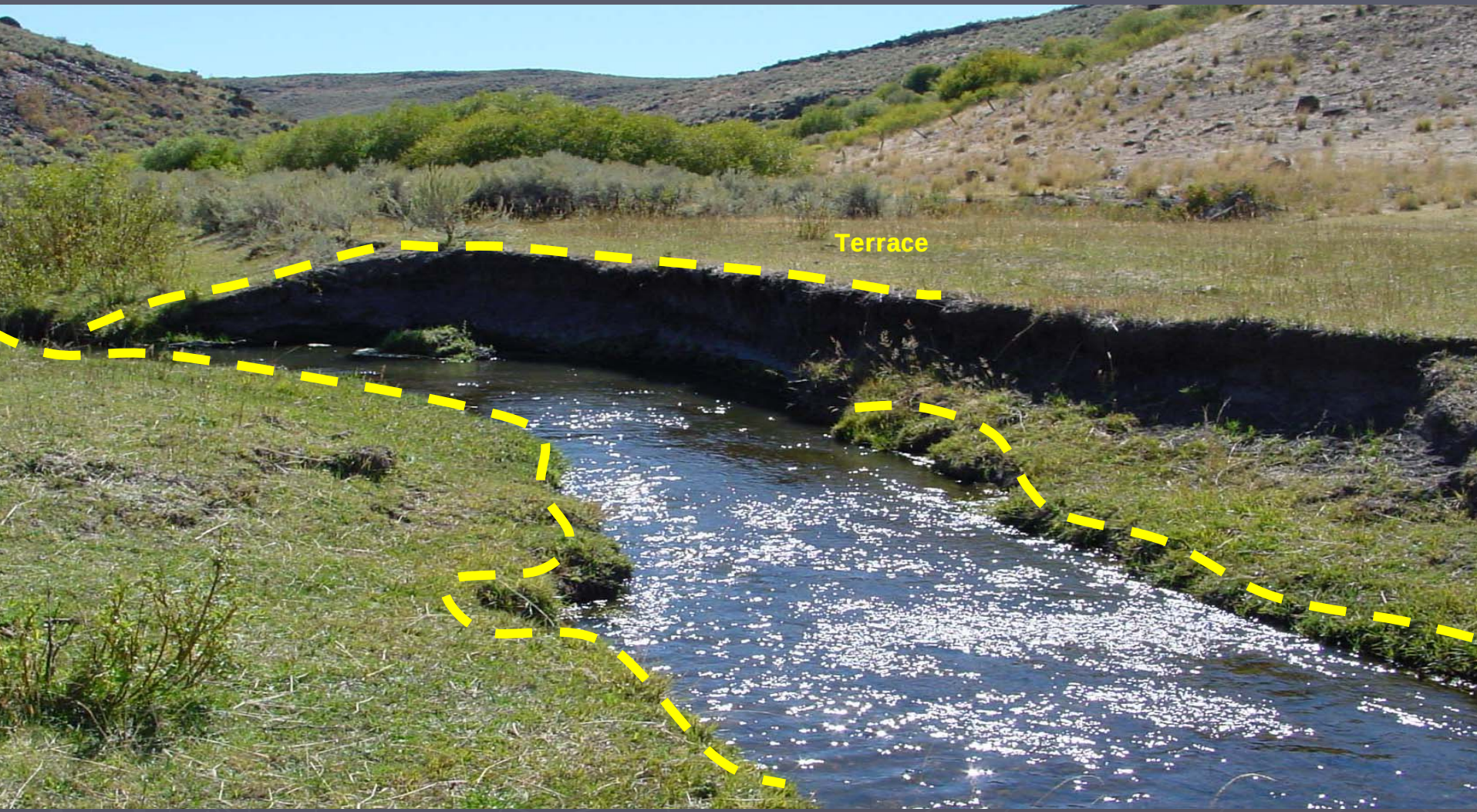
- Dominant greenline vegetation
  - Caaq on 43% of plots, Range 36% to 49%
- Sub-dominant greenline vegetation
  - Mf on 57% of plots, Range 51% to 64%
- Woody regeneration – seedlings/saplings
  - Mean 18%, Range 7% to 26%
- Woody regeneration – young plants
  - Mean 39%, Range 26% to 45%

Tests

- Streambank cover
  - Mean 93%, Range 91% to 95%
- Streambank Stability
  - Mean 84%, Range 78% to 90%


Percent greenline composition - Plot vs Continuous methods
40%
35%
30%
25%
20%
15%
10%
5%
0%
Percent of composition
Plot
Continuous
artr
cane
juef
popr
sage
sage/cane
sage/eq
sage/juef
sage/popr
salu/juef
scsp
caut
sabe/popr
sage/caut
salu/cane
Community Type

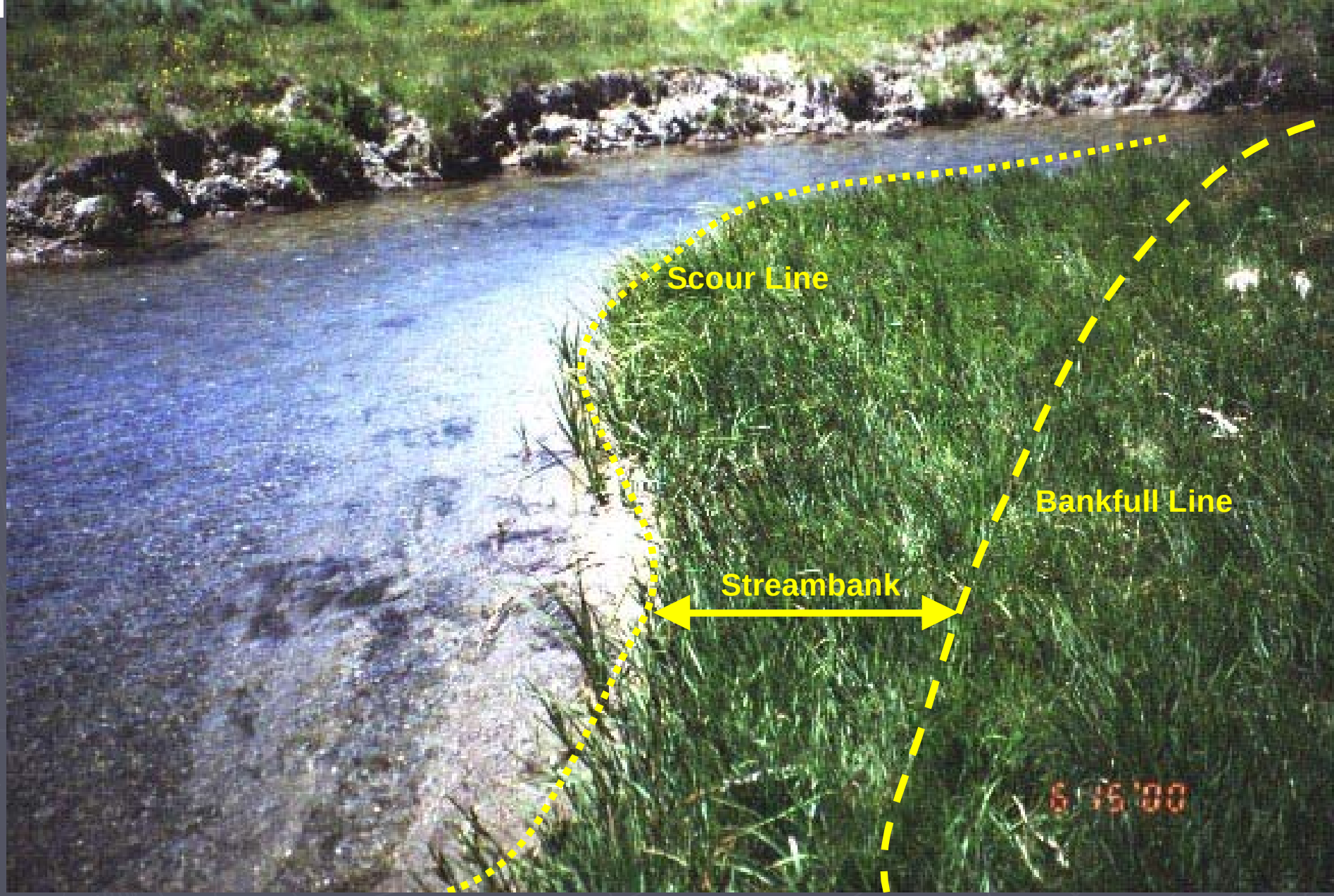
The “Greenline”



The first perennial vegetation above the water line

The greenline is on the streambank approximately parallel to the water flow. Streambanks perpendicular to the stream flow are not considered greenline.

Shearing
Bank Trampling
MAY 10 2001


Scour Line
Bankfull Line
Streambank

Conclusions

- Precision & Accuracy affected by ability to correctly locate the “greenline”, sample size, and training
- Using a single indicator like stubble height is not appropriate.
- One size does NOT fit all.
- Multiple indicators at the same location or plot has advantages.